

<b>Notice of Allowability</b>	Application No.	Applicant(s)
	09/966,099	KAMIYA ET AL.
	Examiner	Art Unit
	Salman Ahmed	2666

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTO-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1.  This communication is responsive to 10/1/2001.
2.  The allowed claim(s) is/are 1-9.
3.  The drawings filed on 07 December 2001 are accepted by the Examiner.
4.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)  All    b)  Some\*    c)  None    of the:

1.  Certified copies of the priority documents have been received.
2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3.  Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5.  A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6.  CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a)  including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1)  hereto or 2)  to Paper No./Mail Date \_\_\_\_\_.
  - (b)  including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
7.  DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

  
**DANG TON**  
 PRIMARY EXAMINER

#### Attachment(s)

1.  Notice of References Cited (PTO-892)
2.  Notice of Draftsperson's Patent Drawing Review (PTO-948)
3.  Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
 Paper No./Mail Date 4/8/04, 12/7/01
4.  Examiner's Comment Regarding Requirement for Deposit  
 of Biological Material
5.  Notice of Informal Patent Application (PTO-152)
6.  Interview Summary (PTO-413),  
 Paper No./Mail Date \_\_\_\_\_.
7.  Examiner's Amendment/Comment
8.  Examiner's Statement of Reasons for Allowance
9.  Other \_\_\_\_\_.

**DETAILED ACTION**

**EXAMINER'S AMENDMENT**

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows:

In line 20 of Claim 1 "patter" is corrected to -- pattern --.

***Allowable Subject Matter***

2. Claims 1-9 are allowed.
3. The following is an examiner's statement of reasons for allowance: The instant application claims of a scheduler, for scheduling packet forwarding connections from input ports to selected output ports at each timeslots in a crosspoint switch comprising: MxM scheduling modules each of which schedules packet forwarding connections from a corresponding group of input ports to selected

group of output ports based on reservation information of combinations of corresponding input and output ports of each time slot, logical queues for each input ports, wherein the input ports are equally divided into multiple groups and output ports are equally divided into multiple groups; and a selector selecting a sequential one of module patterns using diagonal service pattern, where module patterns select different scheduling modules so as to avoid collision with each other. The scheduling modules concurrently in its own process perform reservation of packet forwarding connections based on current reservation information of combinations of corresponding input and output ports, update current reservation information received from two previous stage modules, and transfers updated reservation information to two subsequent modules in row and column direction to accomplish pipelined scheduling.

The cited prior art Ramamurthy et al. (US PAT 6618379), hereinafter referred to as Ramamurthy, teaches of an N stage pipeline system for scheduling a NxN switch where each stage schedules transmission to an output in a future timeslot, said future time slot rippling through all the stages, where all stages are processing concurrently in such a way that no two inputs choose the same future timeslot at the same time, output slots being selected based on a round robin fashion.

The cited prior art Angle et al. (US PAT 6661788), hereinafter referred to as Angle teaches a fabric network device, with a plurality of input ports, plurality of output

ports and a configuration manager. The configuration manager comprises: an input queue status block, timeslot scheduling control logic, a multicast scheduler and a unicast scheduler. The timeslot scheduling control logic initiates unicast and multicast scheduling during appropriate scheduling timeslots. A pipelined scheduling is achieved by using Global Multicast Round Robin Counter (GRRC), Output Round Robin Counter (ORRC) and Input Round Robin Counter (IRRC).

The cited prior art Aybay et al. (US PAT 6044061), hereinafter referred to as Aybay, teaches an input buffered multipoint switch having input channels and output channels includes multi-level request buffers, a data path multiplexer and a scheduler. A method of data scheduling is achieved by receiving a transmission request in input buffers, arbitrating between input and output channels and issuing grants to the input and output channels.

An IEEE June 2000 publication by Dirceu Cavendish "CORPS – A Pipelined Fair Packet Scheduler for High Speed Switches", teach Carry Over Round Robin Pipeline Scheduling, by a fair scheduler for high-speed crossbar fabrics. Cavendish teaches each input port having an input port scheduler module (SM) with each SM being allowed to communicate with single immediate neighbor only. The crossbar switch by applying priority matrix and carry over scheduling achieves its pipelined scheduling steps.

The cited prior arts alone or in combination fail to jointly suggest or teach the claimed combination of features as taught by the instant application. Ramamurthy, Angle, Aybay and Cavendish do not specifically teach a  $M \times M$  crosspoint switch matrix having  $N$  number of input ports,  $N$  number of queue and  $N$  number of output ports where  $N$  input ports are equally divided into  $M$  output groups and  $N$  output ports are equally divided into  $M$  output groups. Ramamurthy, Angle, Aybay and Cavendish do not specifically teach the steps of applying diagonal service pattern in a predetermined diagonal module group and transferring updated input port reservation information and updated output port reservation information to two subsequent stage modules in both row and column directions of the  $M \times M$  module matrix. Therefore claims 1-9 are to be deemed allowable over cited prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

4. The prior arts made of record and not relied upon are considered pertinent to applicant's disclosure.
  - Nonblocking parallel banyan network Zhang US PAT 5132965.

- Batcher-banyan packet switch with output conflict resolution scheme Arthurs et al. US PAT 4817084.
- Method and Apparatus for supplying requests to a scheduler in an input buffered multiport switch Bauman et al. US PAT 6160812.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Salman Ahmed whose telephone number is (571)272-8307. The examiner can normally be reached on 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on (571)272-3174. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Salman Ahmed  
Examiner  
Art Unit 2666

SA

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*Seema S. Rao*  
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SUPERVISORY PATENT EXAMINER  
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